R E P O R T R E S U M E S

ED 003 361 24

FIRST GRADE READING USING MODIFIED CO-BASAL VERSUS THE INITIAL TEACHING ALPHABET.

BY- MAZURKIEWICZ, ALBERT J.
LEHIGH UNIV., BETHLEHEM, PA.

REPORT NUMBER CRP-2676 PUB DATE 65
EDRS PRICE MF-$0.18 HC-$3.32 83P.

DESCRIPTORS- *READING INSTRUCTION, *BEGINNING READING, *METHODS RESEARCH, COMPARATIVE ANALYSIS, EVALUATION METHODS, *TEACHING TECHNIQUES, LANGUAGE ARTS, SPELLING, *GRADE 1, *ORTHOGRAPHIC SYMBOLS, TRADITIONAL ORTHOGRAPHY (T.O.), BETHLEHEM, PENNSYLVANIA, ITA

DIFFERENCES BETWEEN THE TWO METHODS OF FIRST-GRADE BEGINNING READING INSTRUCTION WERE INVESTIGATED. APPROXIMATELY 920 FIRST-GRADE CHILDREN WERE DIVIDED INTO 2 GROUPS WHICH RECEIVED 1 OF THE 2 METHODS. TO DETERMINE THE EFFECTS OF CERTAIN VARIABLES ON READING ACHIEVEMENT, THE CHILDREN WERE MATCHED IN PAIRS. THE RESULTS WERE GATHERED FROM ONE GROUP USING MATERIALS PRINTED IN TRADITIONAL ORTHOGRAPHY (T.O.) AND ANOTHER USING THE INITIAL TEACHING ALPHABET (ITA). THE USE OF ITA IN LANGUAGE ARTS WAS FOUND SIGNIFICANTLY BETTER IN THE DEVELOPMENT OF WORD READING SKILL, BUT INFERIOR TO T.O. IN THE DEVELOPMENT OF SPELLING SKILLS. THE INHIBITING EFFECTS OF PHONEME-GRAPHEME CORRESPONDENCE WERE NOT OVERCOME BY EITHER METHODOLOGY. FURTHER STUDY OF THE EFFECTS OF ITA INSTRUCTION WAS SUGGESTED. (RS)

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education
This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.

First Grade Reading Using Modified Co-Basal Versus the Initial Teaching Alphabet

Cooperative Research Project No. 2676

Albert J. Mazurkiewicz

Lehigh University

Bethlehem, Pennsylvania

1965

The research reported herein was supported by the Cooperative Research Program of the Office of Education, U.S. Department of Health, Education, and Welfare.

ED 003361

ACKNOWLEDGEMENTS

The cooperation of teachers, principals, and the superintendent of the Bethlehem Area Public School District is gratefully acknowledged.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	THE PROBLEM AND OBJECTIVES OF THE STUDY.	1
	STATEMENT OF THE PROBLEM	1
	HYPOTHESIS AND OBJECTIVES POSTULATED FOR THIS STUDY	4
	LIMITATIONS OF THE STUDY	6
	Experimental Design.	6
	Statistical Plan	6
	The Initial Population	6
	Population Problem I	7
	Population Problem II and III.	7
	Population Problem IV and V.	8
	Tests Administered	8
	Terms Defined.	12
	RELATED RESEARCH	14
	SUMMARY.	19
II.	PROCEDURES	20
	POPULATION: GENERAL DESCRIPTION	20
	PUPIL SELECTION.	22
	GEOGRAPHICAL DISTRIBUTION.	22
	TEACHER POPULATION	23
	Teacher Selection.	23
	Teacher Training	25
	In-Service Activities.	27
	THE INSTRUCTIONAL PROGRAM.	27

CHAPTER		PAGE
	CONTROL OF TIME FACTORS.	33
	HAWTHORNE OR PLACEBO FACTORS	35
	PRE-TESTING DATA	36
	Population Data Problem I.	37
	Population Data Problem II and III	38
	Population Data Problem IV and V	39
	COLLECTION OF DATA	42
	STATISTICAL PROCEDURES	43
	SUMMARY.	45
III.	RESULTS AND DISCUSSION OF FINDINGS	46
	PROBLEM I, TENTH WEEK FINDINGS	46
	PROBLEM II, RANDOM SAMPLE MID-POINT RESULTS.	47
	PROBLEM III, RANDOM SAMPLE YEAR-END RESULTS.	49
	PROBLEM IV, YEAR-END RESULTS	50
	PROBLEM V, SEX AND SOCIO-ECONOMIC EFFECTS ON READING ACHIEVEMENT	53
IV.	CONCLUSIONS AND IMPLICATIONS	57
	CONCLUSIONS.	57
	Problem I.	57
	Problem II	57
	Problem III.	57
	Problem IV	58
	Problem V.	58
	General Conclusions.	58
	Implications for Education	59
	Implications for Further Research.	60

PAGE

BIBLIOGRAPHY 63

APPENDICES 64

A. Supporting Data on Major Problems. 64

B. Selected Tests Used in this Study. 70

LIST OF TABLES

TABLE		PAGE
I.	Lee-Clark Reading Readiness Test Results on the I.T.A. and T.O. Populations.	23
II.	Characteristics of Teachers of the I.T.A. and T.O. Populations	25
III.	The Instructional Week Schedule.	34
IV.	California Test of Mental Maturity and California Test of Personality Scores of the Experimental Populations	38
V.	Pintner-Cunningham I.Q. Scores of the Random Samples from Both Treatment Groups, N=35	39
VI.	Additional Preliminary Test Data on the I.T.A. and T.O. Populations.	40
VII.	Population Characteristics Which Suggest Inadequate Matching.	41
VIII.	Instructional Level Achievements at the Tenth Week Point of the I.T.A. and T.O. Populations.	46
IX.	Instructional Achievement Levels of the Random Sample Populations as Measured by the Botel Reading Inventory Printed in the Media Used by the Populations.	47
X.	Primary I, Stanford Achievement Raw Score Test Results on the Random Sample Population	49
XI.	Year-end Results of the Random Subsample Populations on Measures of Oral Reading and Word Recognition	50
XII.	Stanford Achievement Test, Primary I, Form X, Results on the I.T.A. and T.O. Populations at the End of 140 Days of Instruction, Both Populations Tested in the T.O. Medium.	51

TABLE PAGE

XIII. Means, Standard Deviations and z Test Scores of the Matched Pairs on the T.O. Form of the Stanford Achievement Test, Form X 52

XIV. Interaction of Sex and Treatment on Reading Achievement of Matched Male Pairs. 53

XV. Interaction of Sex and Treatment on Reading Achievement of Matched Female Pairs. 53

XVI. Interaction of Above Average Socio-Economic Status and Treatments on the Reading Achievement of Matched Pairs 54

XVII. Interaction of Below Average Socio-Economic Status and Treatments on the Reading Achievement of Matched Pairs 54

XVIII. Interaction of Sex, Above Average Socio-Economic Status and Treatments on Reading. 55

XIX. Interaction of Sex, Below Average Socio-Economic Status and Treatments on Reading Achievement of Male Matched Pairs. 55

XX. Interaction of Sex, Above Average Socio-Economic Status and Treatments on Reading Achievement of Matched Female Pairs. 56

XXI. Interaction of Sex, Below Average Socio-Economic Status and Treatments on Reading Achievement of Matched Female Pairs. 56

CHAPTER I

The Problem and Objectives of the Study

PROBLEM:

The variety of material available for reading instruction indicates the numerous attempts to solve the difficulties children ordinarily have in achieving reading skill in the first grade. Each of these programs can be evaluated as an attempt to meet the motivation with which the child enters school: to learn to read and write. Although numerous shortcomings in the timing of programs as embodied in materials have been noted, it has been observed that when at last the child begins to be exposed to learning, the inconsistencies in spelling of the English language for the average child produces a small element of daily failure which cumulatively undermines the child's self-confidence. The result by the end of the first grade year, ego-satisfaction repeatedly denied, is that the child's self-concept, his ego-strength, is damaged and a general negative attitude toward school, learning, and reading in particular, has been developed.

One of the basic problems connected with learning to read in traditional orthography is suggested here and has been related to the theory which states that when stimuli are the same but responses different, associative inhibition is usually obtained. Thus, it has been seen that if the child is first taught the letter æ (A), then a bit later that the same symbol represents ɑ (cɑlm), then a (apple), etc., that each subsequent learning interferes with the previous learning to some extent and confusion in responses to the

stimulus becomes evident.

Linguistic solutions of more recent date have attempted to simplify beginning reading materials by using regularly spelled words to avoid the orthographic complexity of English. Such linguistic solutions have not received much recognition because they seem to offer solutions which are no better than those provided by the basal reader insofar as the earliest materials are concerned: story content devoid of interest and the rudiments of the program lacking in significance for the beginner. The attempt to simplify phonics toward the end of developing word recognition skill as early in the first grade as possible has been stymied largely by the complexity of the spellings of English. Linguistic solutions as suggested by Godfrey Dewey in the United States and others in England in terms of simplifying the alphabet in prior years achieved little recognition in that a degree of spelling reform was suggested in the proposals.

Sir James Pitman's more recent proposal suggested that the value of a simple and reliable alphabet lies only in its appropriateness for learning to read and offered a design of an interim teaching alphabet to be used only until the pupil is ready to transfer to conventional orthography. Since the Initial Teaching Alphabet[1] as an orthography approximates traditional orthography[2] while

---

[1]Abbreviated to the letters I.T.A. hereafter.

[2]Abbreviated to the letters T.O. hereafter.

being highly consistent, he felt, it could serve as an introduction to the complex orthography normally used in writing the English language.

Wide-scale studies of the effect of the change in the orthography that the child sees and uses in reading achievement produced significant results early in the experimentation conducted in England. Results which were available from comparable populations suggested that traditional orthography was a significant source of difficulty in beginning reading, that children could learn to read more rapidly and with less observable frustration using this form of simplification, and that reading achievement post-transition was significantly better than that achieved by a comparable population using comparable traditional alphabet materials.

Thus, the use of a one-to-one phoneme-grapheme notational system such as I.T.A., as inferred from the British reports, appears to get at the heart of the difficulty a child has in learning to read and eliminates the factor of associative inhibition in early learning.

While the reports from the University of London indicated that the materials used were identical in both populations except for a change in orthography, the methodologies used by the various teachers in either of the experimental or control populations were permitted to vary according to the basic approach the teacher generally used. This investigator's observations in the English classroom suggested that though the material be identical, differences in approaches to

instruction did exist even within the broad characterizations of look-say or strong phonic emphasis, and that these were inherent in the media used. It appeared that traditional spelling demanded the use of a complex of rules and skills in teaching word recognition while I.T.A. demanded few, and that the medium used encouraged or discouraged certain activities (creative writing, writing to reinforce word recognition, etc.).

Early results in the first year of the Lehigh University - Bethlehem Schools I.T.A. Study, comparing the achievements of two populations, one of which used I.T.A. materials designed to take advantage of inherent methodology and the other a language-arts oriented co-basal reading program with similar methodology, appeared to confirm the British findings.

Since the I.T.A. program contained some elements which differed from those used with the basal materials, it might be erroneously concluded that the use of an initial teaching alphabet for reading instruction is alone responsible for the large advances in early reading achievement noted, while in fact the technique used may be largely responsible for these differences.

HYPOTHESIS AND OBJECTIVES

This study seeks to investigate the differences, if any, in reading achievement at the end of the first grade year in two matched populations both of which use the same elements in a language-arts approach to reading instruction but in which one population uses co-basal materials printed in traditional orthography while the other

uses Initial Teaching Alphabet materials. The hypothesis being tested is that method rather than medium is responsible for the differences in reading achievement thus far noted and that if method is controlled, no significant differences in reading achievement will be found.

The questions this research is designed to answer are the following:

(1) Is there a difference in reading achievement in the tenth week of school as reflected in instructional level achievements when the same method is used but the medium (Traditional Orthography or Initial Teaching Alphabet) is different?

(2) Is there a difference in reading achievement of the I.T.A. and T.O. subsample populations at a midpoint in instruction when the populations are tested on identical material but printed in the orthography used in instruction?

(3) Is there a difference in reading achievement of the I.T.A. and T.O. subsample populations at the end of 140 days of instruction on T.O. measures of oral reading accuracy and word recognition?

(4) Is there a difference in reading and spelling achievement on a T.O. standard between the I.T.A. and T.O. matched populations at the end of 140 days of instruction?

(5) What effect does sex and socio-economic status have on reading achievement under either orthography when the

populations are matched on I.Q., sex, socio-economic status, number of years of school experience, and uni-lingual backgrounds?

Limitations of the Study

Experimental Design. This study was primarily an analysis of the experimental effects of the two treatments on the achievement of first grade children at three points in the school year on a variety of tests of reading and spelling when methodology was controlled.

Statistical Plan. Group and individual results on the tests were used for statistical treatment. The results obtained on the different tests were analyzed by employing large sample statistics. Initial analyses of the results from the major populations were followed by analyses of the matched and the randomly selected populations from each treatment group.

The Initial Population. The subjects initially selected for this study included a population of nine hundred and twenty-six (926) first grade boys and girls of the Bethlehem Area School District, Bethlehem, Pennsylvania.

1. School Background. Subjects came from diverse socio-economic backgrounds and were representative of the urban, suburban, and rural population which characterizes the district.
2. Race. The population contained a number of white and Negro children. A small percentage of the children were of Puerto Rican birth or ancestry.

3. Age. Admission to first grade by school policy was predicated on a minimum age of sixty-seven months. The mean chronological age of the major population was seventy-five and one-half months.
4. Intelligence. The mean intelligence quotient as measured by the California Test of Mental Maturity, total score, was 103.72 with a range of 58 to 148.
5. Population for Problem I. The initial population selected was randomly assigned to classes based on readiness test results administered in the kindergarten year with the exception that a proportion of the group falling in each of the four levels of the test was assigned to each classroom to insure heterogeneity in readiness for reading instruction. Schools in each of the areas of the community were assigned to the I.T.A. and T.O. treatments to structure the samples in regards to urban, suburban, rural, low, mid, and upper socio-economic characteristics. The following describe the initial characteristics of the populations selected for the first study:

Treatment one (I.T.A.) Population: C.A. 75.7
Total Readiness 51.6, Total I.Q. 102.8

Treatment two (T.O.) Population: C.A. 75.2
Total Readiness 52.9, Total I.Q. 105.7

Population for Problem II and III

Two subsamples (N=35) were randomly selected from each treatment for individual testing at intermediate and end points in

instruction. The populations selected were found to be not statistically different in regard to intelligence: Treatment one (I.T.A.) I.Q. 111.83; Treatment two (T.O.) I.Q. 110.77.

Final Population, Problems IV and V

Only subjects who completed all of the tests were included in the final populations. Imbalances in the final major populations appeared causative of differences in intelligence. Statistically significant differences in intelligence between the populations limited the interpretation of data from these populations. Matched pairs from each population were selected to exclude variables which might affect final results. Of the one hundred and sixty-four (164) matched pairs initially selected (matched on I.Q., sex, socio-economic status, number of years of school experience, and uni-lingual backgrounds, one hundred and eighteen (118) pairs completed the final tests. The mean I.Q. of the matched pairs was 115.9, S.D. 11.0.

Tests Administered

All group tests listed below were administered by the specially-trained classroom teachers under the supervision of the school district administrators and supervisory personnel and research staff members.

1. Intelligence was initially assessed by the use of the California Short-Form Test of Mental Maturity, Pre-Primary, 1957S-Form[1]. Intelligence was measured using the Pintner-

[1]Published by California Test Bureau, Monterey, California.

Cunningham Primary Test, Form A, (General Ability Tests Revised)[1] to provide common data for the cooperative first grade study.

2. Readiness for instruction was initially assessed using the Lee-Clark Reading Readiness Test[2]. The cooperative study assessment provided data on the following subtests: from the Durrell-Murphy Diagnostic Reading Readiness Test[3]: Identification of Phonemes, Capital Letter Names, Lower-Case Letter Names, and the Learning Rate Test; from the Metropolitan Readiness Test[4]: Word Meaning and Listening Skill; from the Thurstone Primary Mental Abilities Test[5]: Pattern Copying and Identical Forms.
3. Personality characteristics for the initial matching of the major treatment groups were assessed using the California Test of Personality[6].
4. Instructional levels in reading of the major populations were assessed using the range criteria[7] and of the subsample

---

[1]Published by Harcourt, Brace and World, Inc., New York, N.Y.

[2]Published by California Test Bureau, Monterey, California.

[3]Published by Harcourt, Brace and World, Inc., New York, N.Y.

[4]Published by Harcourt, Brace and World, Inc., New York, N.Y.

[5]Published by Harcourt, Brace and World, Inc., New York, N.Y.

[6]Published by California Test Bureau, Monterey, California

[7]Daniels, J. E. "The Effectiveness of Variable Procedure in Reading Level Placement", Elementary English, Vol. 39, No. 6, October, 1963, p. 596.

populations using the Botel Reading Inventory[1] in both I.T.A. and T.O. forms.

5. Reading and spelling as characterized by the standardized tests for both the subsample and matched pair populations was measured using the subtests of the Stanford Achievement Test, Primary I, Form W[2], in both I.T.A. and T.O. versions, and the Stanford Achievement, Primary I, Form X[3] in its T.O. form.
6. Accuracy in reading of the subsample population was assessed using the Gilmore Oral Reading Test, Form A[4].
7. Word recognition ability of the subsample population was assessed using the Phonetically Regular Words Oral Reading Test[5], the Karlsen Phonemic Word Test[6], and the Gates Word Pronunciation Test[7].

---

[1]Published by Follett and Company.

[2]Harcourt, Brace and World, Inc., New York, N.Y.

[3]Ibid.

[4]Published by Harcourt, Brace and World, Inc., New York, N.Y.

[5]Designed for Office of Education Studies (see Appendix B).

[6]Ibid., (see Appendix B).

[7]Ibid., (see Appendix B).

Description of the Variables Tested

The variables tested in this study are described in the order of the problems given previously.

Instructional Level. This level corresponds to a designated level of a reader and is characterized by the child's ability to recognize words in context and comprehend the stories of that reader. The criteria used to judge his achievement and determine whether he is adequately placed for instruction in this reader are identified as a score in word recognition in context of 90 to 97 per cent and an ability to comprehend the material with 75 to 79 per cent accuracy on factual, inferential, and vocabulary questions.

Instructional Level Achievement. Botel defines achievement on this test of word recognition as a score of 70 per cent or better at one or more levels. This test has twenty word items at the following levels: Pre-Primer, Primer, First, 2^1, 2^2, 3^1, 3^2, 4, and measures the child's ability to identify a word without the aid of context.

Reading Accuracy. This subtest from the Gilmore Oral Reading Test measures the child's ability to accurately identify the words of a selection being read orally at sight.

Gates Word Pronunciation Test. A child's ability to identify high frequency words in which a phoneme is spelled in irregular manner is tested by this list.

Phonetically Regular Words Oral Reading Test. This test measures a child's ability to recognize words in which all parts are

regularly spelled.

Karlsen Phonemic Word Test. This assesses a child's ability to recognize low frequency words which are phonetically regular.

Stanford Achievement Test. The subtest of Word Reading is described by the authors as measuring the child's ability to analyze a word without the aid of context.

The subtest of Paragraph Meaning is described as measuring the child's ability to comprehend connected discourse.

The subtest of Vocabulary is described as measuring higher-level comprehension of concepts and fullness of understanding of terms independent of reading skill. It is further described as a measure of general knowledge.

The subtest of Word Study Skills is described as measuring the child's ability in auditory perception of beginning and ending sounds, phonics, and rhyming words.

The subtest of Spelling is described as measuring the child's ability to spell words commonly found in first grade readers.

Terms Defined. In this study only the end results of instruction in reading and not the reading process itself is studied. The use of such terms as the language arts approach, the co-basal program, the Initial Teaching Alphabet, and Traditional Orthography are basic to an understanding of the study.

1. The Initial Teaching Alphabet. A forty-four character notational system representing the forty sounds of English.

A complex of rules in its use permits the creation of a relatively unambiguous orthography.

2. Traditional Orthography. The standard method of grouping the 26 letter alphabet to form words. This is more generally recognized as the way we normally spell words.
3. Language Arts Approach. A method of instruction in which the language of the child is used in building an awareness of the relationship of sound to symbol, words to print, and is followed by the use of writing to reinforce and extend this learning. Listening, speaking, reading, and writing are used simultaneously in instruction to develop reading and writing skill.
4. Co-basal Program. The use of the basal reader series in a program of reading instruction where each series is used with a segment of the population either to avoid duplication of experience with resultant loss in interest in the material or to meet the difference in the ability of the population of a given class. The latter use is the one which was of first importance in this study.
5. Frequency of Sound Occurrence Order. The symbols of the I.T.A. have been ordered in a sequence which was based on a study of the frequency of usage of a sound in the speech and writing of children[1]. The introduction of the graphemes

---

[1]Dewey, G., Relation Frequency of English Speech Sounds, Harvard University Press, Cambridge, 1923, is the basic study of this occurrence.

of traditional orthography followed the sequence of sounds given by the Early-to-Read I.T.A. program[1].

Related Research

The Initial Teaching Alphabet by Sir James Pitman as described to the Royal Society of Arts (9) in 1960 (at that time described as the Augmented Roman Alphabet) was a 43 character notational system. He described the alphabet as follows.

> "(i) it is wholly lower-case; (ii) all but two of the Roman alphabet characters have been retained; (iii) there are 15 augmentations, which are linked manually and auditorily to T.O. [traditional orthography]....In all there are retained 24 Roman lower-case characters, and there are 19 augmentations.
>
> Lower-case characters have been chosen because they are these with which the child will be most frequently confronted in books; and because the presence of ascenders and descenders evidence each printed word with a more discriminating characterization and makes them more legible than would capitals."

Fourteen of the 19 augmentations are "digraphic (e.g. æ, th)." Those of the remaining five augmentations are similar to familiar forms in cursive writing and two are unusual forms. The forty-fourth character, r, was added by the linguistic committee reviewing the first year of research.

Pitman's I.T.A. as described by Downing (1) appears to make a

> "direct attack on those two features of the standard alphabet which appear to be the root of failure in learning to read the Phonic way:
> (1) I.T.A. has enough characters to provide one printed symbol for each of the phonemes of English.
> (2) Each character in this alphabet carries only one simple value for phonic word-holding.

---

[1] Early-to-Read I.T.A. Series, Mazurkiewicz, A. J. and Tanyzer, H. J., I.T.A. Publications, New York, 1963.

The fulfillment of the aims of look-say teaching can be achieved because:

(1) There is no disturbance of the visual image through the presentation of alternative patterns.

(2) Every possibility for repetition of the look-say pattern of the word is utilized because there is no competition between alternative patterns."

Mazurkiewicz (5) qualified this statement and noted that

"Pitman's aim of providing a simple systematic medium for beginning readers without permanent spelling reform called for a compromise in his design of I.T.A.; a compromise between, on the one hand, the need for simplification and consistency for the beginning reading code and on the other hand the need to make I.T.A. compatible with conventional orthography so that transition from I.T.A. to standard print should be less traumatic for children when they reach the transfer stage. For example, c and k have both been kept to represent the same single phoneme in order to reduce the number of words whose spellings, and hence visual cues, have to be changed at this transfer stage. Similarly double letters are retained to help preserve the overall patterns of words, e.g. rabbit, letter."

The alphabet, moreover, is redundant and, in the sense of correspondence of sound to symbol, is 91 to 100 per cent phonetic. Since several letters correspond to the same sound values, a degree of ambiguity is reflected in the alphabet from the beginner's view point. As described by Mazurkiewicz (8)

> "Further ambiguities result from the use of y as both consonant and vowel, the rules of spelling, the need to choose alternatives in word forms for transitional values, and conventions in spelling words such as been, and words ending in age. The resultant orthography is imperfect in a phonetic sense. However, the reduction of ambiguity in sound-symbol correspondence is the major factor which accounts for the ease of development of beginning reading and writing while its imperfections are in agreement with research which describe the need for establishing for the learner a readiness to accept the inconsistencies of the traditional alphabet."

Research on reading achievement using the Initial Teaching Alphabet up to the present time has largely been the work of Downing

and Mazurkiewicz. Research in the use of a simplified spelling in reading instruction, however, can be found as early as 1852. An extensive experiment in Waltham, Massachusetts, inaugurated by Dr. Thomas Hill, used Issac Pitman's Fonotypy (3) with "marked results". William T. Harris, sponsored investigations in the St. Louis schools as early as 1867 using a system devised by Edwin Leigh (4) and reported that from eighteen to twenty-four months could be saved in learning to read through systematic spelling. While Harrison (3) details a variety of experiments in the early twentieth century all of which report improved reading skill, little attention was paid to this research by reading experts as attested to by the lack of reference to such work in the many professional books that have been published on the subject of reading in the last twenty years. The work of the Simplified Spelling Association in England largely went unnoticed.

The early reports on the use of Pitman's I.T.A. in British schools, however, appeared to stir the imagination and came at a time when linguistic solutions to reading instruction were being given serious consideration. The research in England, reported by Downing (1) in its early form suggested that a major departure from approaches to reading instruction in fashion at the time was being suggested. His reports appeared to confirm earlier findings that reading achievement was induced earlier, was easier to attain, and was attained by a vastly larger percentage of a population than usually expected. Later reports (2) appeared to confirm the early

results and he concluded that I.T.A. "does accelerate the acquisition of basic reading skills, and this primary training in I.T.A. is transferred to T.O. in such a way that a very substantial saving is gained in learning to read T.O."

His early reports that

> (1) "young children get through their beginning reading program faster when their books are printed in I.T.A.
> (2) They can recognize more words in print when they are in I.T.A.
> (3) They can accurately read continuous English prose more readily when it is printed in I.T.A.
> (4) They can comprehend more continuous English print if I.T.A. is used.
> (5) They can read faster when the medium is I.T.A." (1)

seem to have been borne out by later results. The lack of adequate control on his populations and on methodology warranted further investigation.

In contrast to these reports, the work of Sebesta (10) suggests, that no specific effect on the reading achievement of matched pairs at the end of seventy days of work was produced by the use of a synthetic alphabet when compared to the reading achievement produced by a similar program in T.O.

Mazurkiewicz, studying the effects of I.T.A. on reading achievement using similar methodology (7), found that early reading achievement was markedly different and that a statistically significant difference on the vocabulary subtest of the California Reading Test was found to exist between matched pairs at the end of the first and second years of instruction (6). Limitations on his control of methodology in regard to the word recognition program and differences

in the language arts aspects of the two programs appear to limit the tentative conclusions he stated.

SUMMARY

The purpose of this study has been described as an investigation of the effects of two treatments (I.T.A. and T.O.) on reading achievement when methodology is controlled. In addition this chapter has stated the hypothesis postulated and other limitations of this study, including (a) experimental design, (b) statistical plan, (c) the population of the several assessments, (d) tests administered, (e) definition of terms, and (f) related research.

CHAPTER II

PROCEDURES

The design of this study was developed to determine the differences in reading and spelling achievement, if any, between two populations which used different print media when methodology was controlled. This chapter describes the procedures used in selecting the populations, the methodology used in teaching reading and writing, and the factors controlled.

POPULATION

General Description

The population on which the study was conducted all reside in the city of Bethlehem, Pennsylvania. Bethlehem is a community, settled by Moravians, which has felt the impact of every wave of immigration from Europe and is now absorbing families from Puerto Rico. At the time of the 1960 census the population of some 70,000 was 88 per cent white native, 11 per cent foreign born, and one per cent Negro.

The nature of the community may be characterized by noting the range of employment of the fathers of the children. Manufacturing employment in the Allentown-Bethlehem-Easton Metropolitan District, at over 45 per cent of total employment, is considerably above the national average of 25 per cent and the Pennsylvania average of 33 per cent. However, the District is neither unique nor strongly atypical relative to many other communities in the northeastern manufacturing belt. Employment in manufacturing includes a wide socio-economic range of executives, blue-collar

workers and laborers in the corporation and company offices, research centers, and plants of the Bethlehem Steel Company, the Dixie Cup Division of American Can Company, the Allentown Works of Western Electric Company, Bell Telephone Laboratories, and many smaller establishments. In addition to the usual complement of business and professional employment, there are the faculties and staffs of Lehigh University and Moravian College. There are three low-cost housing centers. Some families still live on and work farms laid out generations ago by early settlers. Suburban areas are steadily expanding within the city limits and into two relatively rural townships which are joined by union with the city to form the Bethlehem Area Public School District. The 1960 census report indicates that the median income of the community is $5986.00.

Thirty (30) first grade classrooms, including 926 children enrolled in twenty-six elementary schools in the Bethlehem Area Public School District were included in the initial population. These were divided into two fifteen-class populations matched on the basis of intelligence. The range of intelligence in the first grade classrooms, based on past findings, is normally distributed in the population. Reading achievement of earlier populations has been similar to the national norm. Culturally-deprived sections of the population have had a failure rate in first grade of 33 per cent, while the overall failure has been at 11 per cent, somewhat below the national norms.

Pupil Selection

To obtain data and to satisfy the purposes set for this study, the first grade population entering the Bethlehem Schools was assigned to classes on the basis of the results of the Lee-Clark Reading Readiness Test administered in the Spring of 1964 in the kindergarten year. The assignment was random with the exception that a proportion of the group falling in each of the four levels of the test was assigned to each classroom in school buildings where there was more than one class in each grade. The purpose of this procedure was to insure that each classroom population was heterogeneous with respect to readiness for formal reading instruction.

Geographical Distribution

To insure that the populations in both of the experimental populations (I.T.A. and T.O.) were representative of the whole population, schools in each of the areas of the community were selected. Selection was based on comparability of populations so that urban, suburban, rural, low, mid, and upper socio-economic populations would be included in each population. In this manner it was believed that, a stratified sample of the Bethlehem population would be obtained.

Table I indicates that the two experimental populations were initially well matched using the procedures described above. Although t tests of mean differences indicate that no statistically significant differences exists between the populations, it can be

TABLE I
LEE-CLARK READING READINESS TEST RESULTS ON THE I.T.A. AND T.O. POPULATIONS

Lee-Clark Reading Readiness Test	I.T.A. N=462		T.O. N=439		
	Mean	S.D.	Mean	S.D.	t test
Letter Symbols	20.2	4.03	20.7	3.32	0.25
Concepts	17.3	1.76	17.4	1.71	0.03
Word Symbols	14.1	4.28	14.8	3.76	0.51
Total Readiness	51.6	8.70	52.9	6.97	0.29

seen that the T.O. population appears to be less varied in readiness characteristics as measured by this test.

TEACHER POPULATION

Teacher Selection

Since one year's familiarity with the program was a basic factor in this study, selection of teachers was limited in the I.T.A. population to the inclusion of those teachers who had been in the first year study sponsored by the Fund for the Advancement of Education[#]. These teachers were initially selected in the Spring of 1963 from a group of volunteers. Selection was based on teacher competency as judged by the Elementary Supervisor, the two curriculum consultants and the teacher's principal. The teachers selected were then, in some cases, assigned to schools different from their place of original employment since the child population as determined by its geographical location did not always agree with the place of employment of teachers. In two cases teacher "volunteers" for the first year's work was of a

[#]As reported on in Chapter One.

negative sort in that two teachers volunteered to participate in the study and if there was only one first grade in the building. Thus, in these cases, real enthusiasm for beginning the experimental program was not present.

These fifteen teachers, having completed one year's work in I.T.A. were then included as the teachers of the I.T.A. population for this study.

T.O. Teachers - Second Treatment

All of the thirty-three remaining teachers in the first grade program of the 1963-64 school year were taught and use the language-experience program based on phoneme-grapheme correspondences[#] during this year. Selection of the fifteen teachers to comprise the T.O. experimental teacher population was again based on teacher competency as judged by the school supervisory staff.

Assignment to classes chosen proved less problematical since the schools to be used for matching socio-economic factors had previously been identified. Therefore no teacher needed to be reassigned. (The remaining third of the teacher population was assigned to I.T.A. class instruction in a third experimental unit but is not a part of this study. This population had no familiarity with I.T.A. instruction.)

Teachers in the T.O. population were primarily selected based on their expressed interest in T.O. work. However, at least two

[#]As described by Spaulding, R. B. The Writing Road to Reading, Whiteside, Inc., New York, 1962, pp. 43-66.

teachers had expressed an interest in being included in the second I.T.A. experimental unit. To insure adequate control on the factor of teacher competency these were assigned to T.O. work.

As noted in Table II, below, there was a similar range of professional training in both teacher groups. A few teachers in each group had only normal school certification, some had Bachelor's degrees, and others had earned Master's degrees. Both groups were similar in the number of years of teaching experience

TABLE II
CHARACTERISTICS OF TEACHERS OF THE I.T.A. AND T.O. POPULATIONS

	I.T.A. N=15	T.O. N=15
	Mean	Mean
Age (in years)	41.6	40.8
Teaching experience (in years)	15.9	15.2

and in age. One teacher from each population resigned during the course of the year. The dates for leaving were very close (I.T.A. - March 1, 1965; T.O. - March 19, 1965). Both were replaced with competent substitutes. All teachers were female.

TEACHER TRAINING

In June, for one-half day, and in September, prior to the opening of school, one and one-half days of workshop instruction was provided for all teachers in separate workshops.

Those teachers who comprised the group using the Initial Teaching Alphabet were given review instruction in that they had all had one year's experience with that medium.

A portion of the workshop time was given to discussing those problems which had developed during the first year's demonstration and the ways in which they were solved or alleviated. As an example, during the first year the teachers using this augmented alphabet were continually faced with considerable inconvenience in waiting for materials to arrive from the publishers. Time itself solved this problem. A fairly extensive array of basic and supplementary materials is now available.

The fifteen teachers of the Traditional Alphabet group were similarly informed of the procedures they were to use. The frequency of sound occurrence employed by the Initial Teaching Alphabet program was explained and sequence charts of the phoneme-grapheme correspondences utilizing this procedure were distributed.

Each workshop devoted a portion of time to learning the philosophy and fundamentals of a language arts approach to reading instruction. Teachers were encouraged to develop all the language skills in children: reading, writing, speaking, and listening. The importance and benefits of developing experience charts (for beginning reading activities) were described and demonstrations for using such charts were given.

Mimeograph materials were distributed to all the teachers. These dealt with specific suggestions for initiating experience charts, topics for prompting creative writing, and lists of frequently used words.

In-Service Activities

Throughout the course of the entire year, instructional supervisors assigned to both populations visited each classroom. These observations were made with the intention of evaluating the children's progress, observing the techniques being used, noticing any weak spots and suggesting corrective measures, conferring with teachers on problems, and discussing the general operation of the program. As many visitations as possible were made each week, with at least one visitation per teacher, per week scheduled.

Once a month, for an hour after school, all teachers and instructional supervisors of each population met as a group. These sessions enabled teachers to share ideas and to air current concerns. On several occasions, fellow teachers helped solve one another's problem because of recent similar experiences.

THE INSTRUCTIONAL PROGRAM

Since the method used with both populations was comparable, that being a basal reader approach with a language arts emphasis, the elements of the program described below apply to both populations. All of the elements followed the procedures as outlined in the teacher guides of the Early-to-Read i/t/a Series.

The elements of the program included:

1. an experience approach for beginning reading instruction.
2. a basal reader nucleus program. Provision for differences within the group was made through the use of a second basal series. Thus more able I.T.A.-taught children used

the Early-to-Read materials[1] while less able children used the Downing Readers[2]. More able T.O.-taught children used the Alice and Jerry Readers[3] (Row, Peterson materials) while less able children used the ABC Language Arts Series[4] (American Book Company materials). Supplementary or enrichment readers were available to each population: the Jack and Janet[5] (Nisbit) materials and Reading for Meaning[6] (Houghton-Mifflin) materials.

3. variety in workbook and supplementary skill activities as determined by pupil need.
4. meeting individual needs and rates of learning by grouping according to ability and progress. Special activities and techniques such as the following were included: kinesthetic-tactile word learning, sandbox practice, chalkboard tracing activities, skill building exercises, word card drill, and the use of clay strips in symbol and

---

[1]Published by i/t/a Publications, Inc., 20 East 46th Street, New York City, 1963 and 1964 editions.

[2]Published by Downing Readers, 20 East 46th Street, New York City, 1963 edition.

[3]Published by Row, Peterson and Company, Evanston, Illinois, 1957 edition.

[4]Published by American Book Company, New York, 1958 edition.

[5]Published by James Nisbit and Company, Ltd., Digswell Place, Welwyn Herts, England.

[6]Published by Houghton-Mifflin, Boston, 1957 edition.

letter learning activities for further sensory involvement.

5. wide supplementary reading, which was encouraged by providing classroom book corners and insuring that library use was scheduled. Additional activities, including child-written story books, were provided.
6. writing activities which were structured to begin at the same time that symbols or letters were introduced. Thus, first day or first week activity emphasized the use of writing as an aid to the development of word learning and phonic skills. Spelling or encoding activities were structured on an informal basis as soon as vocabulary could be written using symbols or letters the child learned. An unlimited amount of experience story work was encouraged - at first dictated by the children and teacher-written, then followed by creative-writing by the child.
7. an eclectic word recognition program which followed the frequency of sound occurrence for phoneme-grapheme correspondence but included sight word and structural analysis skill which followed the sequence from auditory perception to visual perception then kinesthetic learning.
8. writing activities which emphasized the phoneme-grapheme relationships according to the frequency of sound occurrence structured for word recognition activities.

9. guided purposeful reading activities which included readiness, silent and oral reading, word analysis, and comprehension skill teaching.

The following sequence chart shows the graphemes taught in the T.O. program according to the frequency of sound occurrence used in the I.T.A. program. Thus the short sound of a was taught simultaneously in each program, limited in each case by the teacher's classroom organization needs. The words in the T.O. columns are illustrative of the graphemes.

I.T.A. character		T.O. letter(s)	
a	appl	a	plant
n	nest	n	not
		gn	gnaw
		kn	kneel
t	tæbl	t	top
e	egg	e	get
		ea	head
b	bell	b	boy
s	santa	s	six
		c	city
r	rabbit	r	run
		wr	wreck
i	indian	i	hit
		y	funny
		ei	forfeit
d	dog	d	dime
l	lion	l	lost
ʃh	feʃher	th	they

I.T.A. character		T.O. letter(s)	
œ	bœt	o	go
		oe	toe
		ow	low
		ou	four
		oa	float
		ough	though
		or	for
		oor	floor
		z	rose
o	ostrich	o	hot
		a	want
		ough	cough
m	mungky	m	me
c	cat	c	car
v	valentien	v	veil
p	pensil	p	pet
æ	ænjel	a	navy
		a-e	gave
		ay	day
		ai	paint
		ea	break
		ey	they
		ei	veil
		eigh	weigh
œ	œgl	e	me
		ee	see
		ea	eat
		ey	key
		ei	ceiling
		ie	field
		i-e	machine
		e-e	mete
f	fiſh	f	father
		ph	phone
		gh	laugh
w	wagon	w	wag
u	sun	u	bug
		ou	country

I.T.A. character		T.O. letter(s)	
ω	bωt	o	do
		ou	you
		ew	grew
		ui	fruit
		oo	moon
		ough	through
ɾ	giɾl	ir	stir
		er	her
		ur	curl
		or	work
		ear	learn
ie	ies creem	i-e	ride
		y	my
		ie	pie
		igh	sigh
h	horse	h	home
k	kœ	k	king
		qu	quit
		x	box
		ch	school
au	aut	aw	law
		au	fault
		a	ball
		ough	thought
ŋ	riŋ	ng	rang
ʃh	ʃhω	sh	sheep
		ch	chamois
		ti	imagination
		si	session
		ci	facial
ω	bωk	u	full
		oo	look
g	gœt	g	green
y	yœ-yœ	y	yellow
ou	oul	ou	round
		ow	cow
		ough	bough
ʧ	ʧær	ch	church

I.T.A. character		T.O. letter(s)	
ɑ	ɑrm	ar	far
j	jack-o-lantern	j	jump
th	thanksgiving	th	throw
wh	whistl	wh	which
ue	united stæts	u-e	mule
		u	music
		ew	new
		ui	suit
ɔi	bɔi	oi	join
		oy	toy
ʒ	televiʒion	dge	bridge
		si	television
z	zæbra	z	zoo

No attempt was made to teach children in the group using the traditional alphabet all of the many alternative sound spelling patterns. Teachers were instructed to introduce the most common patterns of a particular sound. They were encouraged to discuss and elaborate upon any of the others as the occasion demanded. Children's questions about or examples of the less common alternative spelling patterns were treated similarly.

Each teacher was provided with identical key word cards to insure that similar material and identical procedure for introducing sounds, a pictorial example, and the use of the grapheme in a word was being followed.

Control of Time Factors

The schedule shown below for first grade activities was used

as the basis for a control of time spent on reading and related curriculum areas. A total of six hundred and fifty-five (655) minutes per week was provided for all language activities. One hundred and two (102) minutes per day, average, with five hundred and ten (510) minutes per week was provided for reading instruction alone.

TABLE III
THE INSTRUCTIONAL WEEK SCHEDULE

Opening Exercises and Planning				
9:00-9:15	9:00-9:15	9:00-9:15	9:00-9:15	9:00-9:15
Reading				
9:15-10:15	9:15-10:15	9:15-10:15	9:15-10:15	9:15-10:15
Recess	Physical Ed	Recess	Physical Ed	Recess
10:15-10:30	10:15-10:45	10:15-10:30	10:15-10:45	10:15-10:30
Printing	Printing	Printing	Printing	Printing
10:30-10:45	10:45-11:00	10:30-10:45	10:45-11:00	10:30-10:45
Arithmetic				
10:45:11:15	11:00-11:30	10:45-11:15	11:00-11:30	10:45-11:15
Language		Health		Language
11:15-11:30		11:15-11:30		11:15-11:30
Music				
1:00-1:20	1:00-1:20	1:00-1:20	1:00-1:20	1:00-1:20
Reading				
1:20-1:50	1:20-1:50	1:20-2:05	1:20-1:50	1:20-1:50
Science	Science	Recess	Science	Science
1:50-2:10	1:50-2:10	2:05-2:15*	1:50-2:10	1:50-2:10
Recess	Recess		Recess	Recess
2:10-2:25	2:10:2:20		2:10-2:20	2:10-2:25
Reading	Reading		Reading	Reading
2:25-2:40	2:20-2:35		2:20-2:35	2:25-2:40
Social	Studies		Social	Studies
2:40-3:00	2:35-2:55	3:30	2:35-2:55	2:40-3:00
Art	Language		Language	Art
3:00-3:20	2:55-3:15		2:55-3:15	3:00-3:30
3:20-3:30	3:15-3:30		3:15-3:30	

*Dismissal for Church School

Supervisor observations, including time studies, plus teacher logs were used to check on adherence to the schedule provided.

As noted in the schedule, 140 minutes was allotted on Thursday for all language activities. A log of teacher time on Thursday, March 11, 1965, as an example, indicates the close adherence teachers made to the allotment of time. T.O. teachers reported an average of 136 minutes spent that day on all language activities while the I.T.A. teachers reported using 142 minutes. Teacher logs indicate variations from day to day but, in general, little variations between the I.T.A. and T.O. populations was noted. (Greater variation between teachers in either treatment group was noted, however.)

Hawthorne or Placebo Factors

Since it was assumed that a Hawthorne effect would operate in the I.T.A. teacher-child population because of the experimental implication of the new medium, attendant publicity, and/or parental discussions, deliberate attempts to control this factor were made. Visitors, some of whom were authorities in reading, were scheduled into the I.T.A. classes. In the case of the authority figures, these were given complete freedom to question the I.T.A. teachers. It was believed that such questioning would produce a degree of insecurity or anxiety and reduce enthusiasm induced by the use of an experimental medium. The expected effect occurred according to teacher reports and supervisory observations. It was also found that teachers repeated activities for late visitors, and that the visitors interfered with the teacher's normal schedule. Thus, some negative effects appeared to occur.

It was noted also that the children were aware of the experiment and of the experimental medium in their defense of the new alphabet in play and writing activities.

In the case of the second experimental unit, a Hawthorne effect was encouraged by emphasizing the experimental nature of the new procedures, by suggesting competition, though not openly inviting competition, and by scheduling visitors to examine the new procedures. The Hawthorne effect was found to be operating in that teachers reported "I am in competition," "I am not competing but having seen the achievement of the I.T.A. classes, I am trying to help my children do as well," to visitors and supervisors and colleagues.

The children at the same time were aware of the experiment in that T.O. children teased I.T.A.-taught children about their funny writing. They also seemed aware of their status as judged by their positive reaction to visitors.

PRE-TESTING DATA

Preliminary testing of the major populations (I.T.A.-C.A. 75.7; T.O.-C.A. 75.2; t=0.11) was made during the last two weeks of September, beginning September 17, 1965. The following battery of tests was administered by the classroom teachers who were given special training and who were supervised and assisted in their testing by administrative, supervisory, and research staff personnel.

1. Pintner-Cunningham Primary Test (Pintner General Ability Tests, Revised)

2. California Short Form Test of Mental Maturity, 1957S

3. Durrell-Murphy Diagnostic Reading Readiness Test

   a. Identification of Phonemes
   b. Capital Letter Names
   c. Lower-case Letter Names
   d. Learning Rate Test

4. Thurstone Primary Mental Abilities Test

   a. Pattern Copying
   b. Identical Forms

5. Metropolitan Readiness Test

   a. Word Meaning
   b. Listening Skill

6. California Test of Personality

Population Data, Problem I

Both the California Test of Mental Maturity and Personality were first scored by teachers and rescored and checked by members of the research staff. All of the other tests were scored and checked by trained research staff members. Since both the California Test of Mental Maturity and the California Test of Personality were used in matching in the previous study, these were again administered. As noted in Table IV, an attrition in the N of the populations has occurred since only those children who completed both tests were included in this initial study of matching characteristics. The populations appear to be well matched since no statistically significant differences between the means of the two populations are found. It can be inferred, however, that the T.O. population is slightly more able and better adjusted than the I.T.A. population and that the ability of the T.O. population is also less

varied.

TABLE IV
CALIFORNIA TEST OF MENTAL MATURITY AND CALIFORNIA TEST OF PERSONALITY SCORES OF THE EXPERIMENTAL POPULATIONS

	I.T.A. N=417		T.O. N=402		
	M.	S.D.	M.	S.D.	t test
California Test of Mental Maturity					
Non-Language I.Q.	102.0	18.20	106.6	16.02	0.58
Language I.Q.	105.1	13.21	104.4	14.50	0.09
Total I.Q.	102.8	15.18	105.7	12.62	0.38
California Test of Personality					
Personal Adjustment	29.8	22.57	32.3	20.40	0.87
Social Adjustment	27.0	22.53	31.1	21.34	1.49
Total Adjustment	28.4	21.04	32.0	18.85	1.30

Population Data, Problems II and III

Intermediate point testing of the population, planned for the mid-point of the instructional period, required the selection of random samples from each population. Subsamples of between 30 and 40 children were to be selected for this testing using a table of random numbers. Table V indicates intelligence levels of the populations selected and that the populations are not significantly different with regard to intelligence.

TABLE V
PINTNER-CUNNINGHAM I.Q. SCORES OF THE RANDOM SAMPLES FROM BOTH TREATMENT GROUPS, N=35

	M.	S.D.	f test
I.T.A.	111.83	13.60	1.55
T.O.	110.77	16.93	

Population Data, Problems IV and V

Table VI, which reports the results of the remainder of the tests given but are based on only those members of the populations who completed all of the testing in May, indicates that the populations are similar as measured by all tests but three. The two significant differences on the subtests of the Durrell-Murphy Readiness Test may be accounted for by the emphasis in the T.O. instructional procedures on letter names in both upper and lowercase forms in the days which preceded the administration of this test. Some seventeen days from the opening of school to the time of this testing had elapsed and instruction in reading and writing proceeded on days when no testing was scheduled as well as during the earliest days of getting the classroom organized. However, the significant difference in the intelligence of the two populations precludes a meaningful comparison of the achievement of the major populations.

TABLE VI
ADDITIONAL PRELIMINARY TEST DATA ON THE
I.T.A. AND T.O. POPULATIONS

	I.T.A. N=389		T.O. N=351		
	Mean	S.D.	Mean	S.D.	t test
Pintner-Cunningham I.Q.	108.33	17.15	110.62	14.7	2.02#
Durrell-Murphy Readiness Test					
Phonemes	32.0	13.46	31.8	13.34	0.08
Capital Letter Names	16.6	7.08	20.0	6.34	2.31##
Lower-case Letter Names	12.0	6.32	16.9	6.49	3.22##
Learning Rate Test	11.7	3.73	12.4	3.47	0.71
Thurstone Primary Mental Abilities Test					
Pattern Copying	16.5	8.52	17.7	8.31	0.81
Identical Forms	15.4	5.40	15.2	4.99	0.14
Metropolitan Readiness Test					
Word Meaning	8.4	2.98	9.7	4.35	1.80
Listening Skill	8.9	2.42	9.3	4.16	0.55

#significant at the 5 per cent level
##significant at the 5 per cent and 1 per cent levels respectively

Attrition in the N of the populations is again noted when only those completing all of the tests were studied.

An investigation of possible causes of this variation indicated the following characteristics may be partially responsible:

TABLE VII
POPULATION CHARACTERISTICS WHICH SUGGEST
CAUSATIVE FACTORS FOR INADEQUATE MATCHING

	I.T.A. N=389	T.O. N=351
Repeaters in each population	10.3%#	9.0%#
Bilingual children or children speaking little English	4.2%	1.5%
Socio-economic status as reflected in family income below $3500.00	40.1%	28.7%

#Most of the repeaters from each population had been previously subjected to the treatment (I.T.A. or T.O.) in which they are now found.

A meaningful comparison of the major populations at the end of the year is precluded by the results of this study of the matching of the populations. To eliminate the effect of differences noted in the populations, 164 pairs were selected, matched on I.Q., sex, and socio-economic status. Matching of the population was completed only after children who had not had one year of kindergarten experience, who were repeaters, or who had bilingual problems were excluded from the populations. Thus the pairs were selected from children who each had one year of kindergarten experience, had no previous instructional experience in first grade, were not limited by bilingual difficulties, and were matched on sex, I.Q., and socio-economic status. Mean I.Q. of the 164 matched pairs: 114.9. Of the matched pairs, only 118 pairs completed all the final tests and thus this number was used in the year-end

analyses. Mean I.Q. of the 118 matched pairs: 115.09, S.D. 11.0. Sixty-three girls and fifty-five boys were included in the 118 matched pairs.

COLLECTION OF DATA

To satisfy the purposes of the study as structured by the problems described in Chapter One, instructional level identifications at the tenth week were made. Teacher placements of children at instructional levels were checked against established standards for judging instructional level placement. These criteria indicate that a child must have 90 to 97 per cent word recognition skill in context and 70 to 79 per cent comprehension.

Intermediate point testing, the last week of January and the first week of February, on informal word recognition inventories and on transliterated and T.O. versions of the Stanford Achievement Test, Form W, required the selection of two random samples from the population. All of the tests used were administered and scored by the research staff.

End of year testing, following 140 days of instruction, was begun May 10th and completed within the ten days allotted for the cooperative study. Tests administered to the major populations included the following:

Stanford Achievement Test, Primary I, Form X

Word Reading
Paragraph Meaning
Vocabulary
Word Study Skills
Spelling

A writing sample, using restricted and non-restricted stimuli was also administered to the entire population as a part of the cooperative study at this time. No analysis of these results was made. All of the above testing was administered by classroom teachers under the supervision of principals, supervisory and research staff present. One week prior to the time of testing, a program of teacher training was held to insure correct administration of the tests. Tests were initially scored by the teachers working in teams under close supervision. All tests were rescored; the results were punched onto IBM cards for computer treatment.

Subsample testing during the same period, between the 140th and the 150th day of instruction included the following:

Gilmore Oral Reading Test
Phonetically Regular Words Oral Reading Test
Karlsen Phonemic Word Test
Gates Word Pronunciation Test

All of the subsample testing was administered and scored by members of the research staff. Tests were rescored and checked by a second member of the staff before statistical work was completed.

STATISTICAL PROCEDURES

The statistical techniques employed in this study were selected to solve specifically the problem under investigation. The use of a particular statistical technique required an examination of available data with regard to the assumptions underlying the use of that statistical technique. The following techniques were found acceptable and were applied to the results of the tests administered: *t* test and *z* test of the significance of the

differences between means on correlated and uncorrelated samples. Matched pair data were used as a means of controlling sources of variation in studying the effects of the I.T.A. and T.O. treatment on year-end test results and to study the effects of sex and socio-economic status on reading achievement when populations were matched on I.Q. and chronological age.

SUMMARY

This chapter described the procedures used in selecting the populations to be studied, described the method by which teachers were selected and detailed the elements of the instructional program each experimental population followed. The tests used to match populations were shown and the populations were described as well matched according to statistical measures. Procedures used in selecting subsample populations and in the collection of data were followed by a description of the statistical techniques to be employed to meet the purposes of the study.

CHAPTER III

RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the findings on the problems studied. It is organized along the lines of the problems established in Chapter One.

RESULTS OF THIS STUDY

PROBLEM I. IS THERE A DIFFERENCE IN READING ACHIEVEMENT IN THE TENTH WEEK OF SCHOOL AS REFLECTED IN INSTRUCTIONAL LEVEL ACHIEVEMENTS WHEN THE SAME METHOD IS USED BUT THE MEDIUM (TRADITIONAL ORTHOGRAPHY OR INITIAL TEACHING ALPHABET) IS DIFFERENT?

As may be inferred from Table VIII, progress in reading of the I.T.A. and T.O. populations as indicated by instructional level achievements at the tenth week, appears to be significantly different. Since no control of the characteristics as noted in Table VII, Chapter Two, was made, it can be further inferred that

TABLE VIII
INSTRUCTIONAL LEVEL ACHIEVEMENTS AT THE TENTH WEEK POINT OF THE I.T.A. AND T.O. POPULATIONS

	I.T.A. N=417		T.O. N=402	
Instructional Levels	Number	Percentage	Number	Percentage
Below Primer	219	52.5	288	96.6
Primer	183	43.9	13	3.2
First	11	2.6	1	.2
Second	4	1.0		

the repeaters in each population may be accounting for achievements beyond the primer level. Assuming that instructional level achievements are reliable, it would appear that a larger number of the I.T.A. children (over 40 per cent) are achieving reading status at an earlier point than was found possible by the population under the T.O. treatment.

PROBLEM II. IS THERE A DIFFERENCE IN READING ACHIEVEMENT OF THE I.T.A. AND T.O. SUBSAMPLE POPULATIONS IN THE FIFTH MONTH OF SCHOOL WHEN THE SAME METHOD IS USED BUT THE MEDIUM IS DIFFERENT?

Intermediate point test results of the random samples of each population during the first week of February on two measures are reported in Tables IX and X. Instructional achievement levels of the random sample populations as measured by the Botel Reading Inventory (each population tested on identical material but the

TABLE IX
INSTRUCTIONAL ACHIEVEMENT LEVELS OF THE RANDOM SAMPLE POPULATIONS AS MEASURED BY THE BOTEL READING INVENTORY PRINTED IN THE MEDIA USED BY THE POPULATIONS

	I.T.A. N=35	T.O. N=35
Reader Level	Percentage	Percentage
4	5.7	2.9
3^2	14.3	.0
3^1	11.4	.0
2^2	2.9	.0
2^1	8.6	.0
1	17.1	.0
P	8.6	17.1
PP	5.7	42.8
Readiness	25.7	37.1

print medium [I.T.A. or T.O.] was different to reflect the different media used in instruction) indicates that the median achievement of the I.T.A. population is at the first reader level while the T.O. median achievement is at the PP reading level. Almost forty-three per cent of the I.T.A. population are found at instructional levels from 2^1 to fourth reader as compared with three per cent of the T.O. population.

The distribution of instructional level achievements of the I.T.A. population above the median suggests that individual differences in intelligence are being reflected in the achievements of the population on an I.T.A. form of this test. The gap between the first reader and fourth reader achievement of the T.O. population suggests that T.O. instruction at this point in the school year has an inhibiting effect on achievement which only a small percentage of the brightest children can overcome. It can be further noted that 31.4 per cent of the I.T.A. population as compared to 79.9 per cent of the T.O. population are found at the pre-primer or below points. The data of this test appear to confirm the findings of the tenth week as noted in Table VIII that instructional level achievement is appreciably better in I.T.A. material than in T.O. material.

Table X, showing the achievements of the I.T.A. and T.O. populations on subtests from the Stanford Achievement Test, indicates that mean differences in achievement in favor of the I.T.A. population exist on all subtests but that these differences are

TABLE X
PRIMARY I STANFORD ACHIEVEMENT RAW SCORE TEST RESULTS ON THE RANDOM SAMPLE POPULATIONS. EACH POPULATION TESTED IN ITS MEDIUM ON FORM W IN THE FIRST WEEKS OF FEBRUARY OF THE FIRST GRADE YEAR.

	I.T.A. N=35		T.O. N=35		
Stanford Achievement Test, Form W	Mean	S.D.	Mean	S.D.	t test
Word Reading	24.7	8.25	13.1	7.03	2.27#
Paragraph Meaning	10.9	9.57	10.0	8.00	0.27
Vocabulary	17.9	7.11	17.3	7.30	1.30
Word Study Skills	39.6	10.33	30.3	9.11	1.09

#significant at the 5 per cent level of confidence

significant at the 5 per cent level only on the subtest of word reading. Thus, advantage for the population instructed in I.T.A. may be inferred with confidence only on the test of word reading when the populations are tested in material printed in the media used in instruction. The mean difference on the subtest of word study skills, while non-significant, suggests that the I.T.A. population is somewhat more proficient in applying word study skills. The lack of significant differences on the subtest of paragraph meaning and vocabulary suggest that these measures may be highly related and be a reflection of the influence of intelligence on this kind of achievement.

PROBLEM III. IS THERE A DIFFERENCE IN ACHIEVEMENT BETWEEN THE I.T.A. AND T.O. SUBSAMPLE POPULATIONS AT THE END OF 140 DAYS OF INSTRUCTION ON T.O. MEASURES OF ORAL READING ACCURACY AND WORD RECOGNITION?

The results on the measure of oral reading accuracy and the three word recognition tests as noted in Table XI indicate that no significant differences between the subsample populations exist on these measures. While neither advantage or disadvantage may be

TABLE XI
YEAR-END RESULTS OF THE RANDOM SUBSAMPLE POPULATION ON MEASURES OF ORAL READING AND WORD RECOGNITION

	I.T.A. N=35		T.O. N=35		
	M.	S.D.	M.	S.D.	t test
Gilmore Oral Reading Test	2.20	2.55	2.45	2.89	.373
Gates Word Pronunciation Test	17.88	19.90	16.71	19.09	.244
Karlsen Phonemic Word Test	18.21	20.88	15.71	19.0	.510
Phonetically Regular Word Test	15.91	17.90	12.62	15.89	.789

inferred for either population on tests such as the above when measured on a T.O. standard, mean differences in the measures of word recognition appear to favor the I.T.A. treatment while the T.O. population appears to be slightly more accurate in oral reading.

PROBLEM IV. IS THERE A DIFFERENCE IN READING AND SPELLING ACHIEVEMENT ON A T.O. STANDARD AT THE END OF 140 DAYS OF INSTRUCTION BETWEEN THE I.T.A. AND T.O. POPULATIONS WHEN METHODOLOGY IS CONTROLLED BUT MEDIA DIFFER?

The data in Tables XII and XIII were obtained to answer the above question. Data in Table XII on the major populations as described in Table VI and VII, in Chapter Two, on a T.O. form of

the Stanford Achievement Test, Primary I, Form X suggests that no

TABLE XII
STANFORD ACHIEVEMENT TEST, PRIMARY I, FORM X, RESULTS ON THE I.T.A. AND T.O. POPULATIONS AT THE END OF 140 DAYS INSTRUCTION BOTH POPULATIONS WERE TESTED IN THE T.O. MEDIUM

	I.T.A. N=385		T.O. N=345		
Stanford Achievement Test Primary I, Form X	M.	S.D.	M.	S.D.	t test
Word Reading	22.3	7.89	21.9	7.25	0.23
Paragraph Meaning	20.6	10.50	21.1	9.31	0.30
Vocabulary	20.7	6.62	22.5	6.64	1.08
Spelling	9.2	6.22	13.5	5.84	4.49#
Word Study Skills	36.4	10.82	39.2	9.45	0.98

#significant at the 1 per cent level

difference in the reading achievement of the I.T.A. and T.O. population exists when measured on a T.O. standard at the end of one hundred and forty (140) days of instruction though the media each population used be different. Spelling achievement, however, as is measured on this test on a T.O. standard, is significantly different. It may be inferred that the T.O. population has an advantage in achieving significantly better spelling skill towards the end of one year of instruction when the medium used for testing is identical to that used in instruction. No disadvantage may be inferred for the I.T.A. populations in reading achievement as measured on this test toward the end of a year's instruction though the medium used for testing is different from that used

in instruction. Since the populations are not equivalent, no reliability is assumed for the above data.

Of the one hundred and sixty-four (164) matched pairs selected at the beginning of the year, only 118 completed the testing at the end of the year. Table XIII, shows the data from the Stanford Achievement Test on the one hundred and eighteen (118) matched pairs (mean I.Q. - 115.9). The data may be interpreted as indicating that advantage is seen for an I.T.A.-taught population on

TABLE XIII
MEANS, STANDARD DEVIATIONS AND z TEST SCORES OF THE MATCHED PAIRS ON THE T.O. FORM OF THE STANFORD ACHIEVEMENT TEST, FORM X

	I.T.A. N=118*		T.O. N=118		
Stanford Achievement, Primary I, Forx X	M.	S.D.	M.	S.D.	z
Word Reading	25.33	6.45	23.47	6.50	2.37#
Paragraph Meaning	23.81	9.64	23.42	8.93	0.35
Word Study	23.08	5.38	24.30	5.99	-1.95##
Spelling	10.25	4.21	14.92	8.95	-7.64#
Vocabulary	41.14	7.85	41.89	8.95	-0.92

Negative z test scores indicate significance is in favor of the T.O. population
#significant at or beyond the 5 per cent level
##approaching significance at the 5 per cent level
*64 of the 118 I.T.A. members of the pairs had made formal transition at the time of this testing

a T.O. measure of word reading even though only 54 per cent of the population has made transition to T.O. but that significantly lower skill in spelling will be achieved. Further, no significant

difference between I.T.A. and T.O.-taught populations may be found in paragraph meaning and word study skills subtests when measured on the T.O. standard.

PROBLEM V. WHAT EFFECT DOES SEX AND SOCIO-ECONOMIC STATUS HAVE ON READING ACHIEVEMENT UNDER EITHER MEDIUM WHEN THE POPULATIONS ARE MATCHED ON I.Q.?

Tables XIV through XXI, showing the interaction of sex, socio-economic status, and treatments on reading achievement as measured by the subtests of the Stanford Achievement Test printed in

TABLE XIV
INTERACTION OF SEX AND TREATMENT ON READING ACHIEVEMENT OF MATCHED MALE PAIRS

	I.T.A. N=55		T.O. N=55		
Stanford Achievement Primary, Form X	M.	S.D.	M.	S.D.	z
Word Reading	23.60	6.82	22.02	6.02	1.38
Paragraph Meaning	21.78	10.37	20.71	8.17	0.64
Word Study Skills	39.20	8.01	40.20	9.31	-1.28

TABLE XV
INTERACTION OF SEX AND TREATMENT ON READING ACHIEVEMENT OF MATCHED FEMALE PAIRS

	I.T.A. N=63		T.O. N=63		
Stanford Achievement Primary, Form X	M.	S.D.	M.	S.D.	z
Word Reading	26.84	5.68	24.73	6.63	1.95#
Paragraph Meaning	25.57	8.57	25.79	8.90	-0.16
Word Study Skills	42.83	7.29	43.37	8.35	-0.49

#approaching significance

TABLE XVI
INTERACTION OF ABOVE AVERAGE SOCIO-ECONOMIC STATUS AND TREATMENTS ON THE READING ACHIEVEMENT OF MATCHED PAIRS

	I.T.A. N=102		T.O. N=102		
Stanford Achievement, Primary, Form X	M.	S.D.	M.	S.D.	z
Word Reading	25.89	6.32	24.07	6.00	2.19#
Paragraph Meaning	24.39	9.46	24.24	8.72	0.13
Word Study Skills	42.20	7.57	42.97	7.31	-0.84

#significant 5 per cent level

TABLE XVII
INTERACTION OF BELOW AVERAGE SOCIO-ECONOMIC STATUS AND TREATMENTS ON THE READING ACHIEVEMENT OF MATCHED PAIRS

	I.T.A. N=16		T.O. N=16		
Stanford Achievement, Primary, Form X	M.	S.D.	M.	S.D.	z
Word Reading	21.75	6.07	19.62	8.03	0.89
Paragraph Meaning	20.06	9.93	18.25	8.53	0.72
Word Study Skills	34.37	6.00	35.00	13.97	-0.22

traditional orthography, indicate that mean differences in favor of the I.T.A. treatment exist in a number of cases but that these differences are generally not statistically significant. Mean differences in favor of the T.O. treatment exist on several of the subtests and these are uniformly non-significant.

The data in Table XV suggests that the I.T.A. treatment has

an effect on the word reading achievement of the female pairs which is almost significant when socio-economic status is not a consideration. Table XVI, on the other hand, contains data which can be interpreted to suggest that above average socio-economic status interacts with the I.T.A. treatment to produce significantly different word reading achievement when the sex of the population is not considered.

TABLE XVIII
INTERACTION OF SEX, ABOVE AVERAGE SOCIO-ECONOMIC STATUS AND TREATMENTS ON READING ACHIEVEMENT OF MATCHED MALE PAIRS

	I.T.A. N=47		T.O. N=47		
Stanford Achievement, Primary, Form X	M.	S.D.	M.	S.D.	z test
Word Reading	24.28	6.72	22.47	5.14	1.551
Paragraph Meaning	22.49	10.18	21.43	8.04	0.576
Word Study Skills	40.26	7.89	41.47	6.95	-0.851

TABLE XIX
INTERACTION OF SEX, BELOW AVERAGE SOCIO-ECONOMIC STATUS AND TREATMENTS ON READING ACHIEVEMENT OF MATCHED MALE PAIRS

	I.T.A. N=8		T.O. N=8		
Stanford Achievement, Primary, Form X	M.	S.D.	M.	S.D.	z test
Word Reading	19.63	6.02	19.38	9.26	0.060
Paragraph Meaning	17.63	10.54	16.50	7.65	0.270
Word Study Skills	33.00	5.66	32.75	15.73	0.048

TABLE XX
INTERACTION OF SEX, ABOVE AVERAGE SOCIO-ECONOMIC STATUS AND TREATMENTS ON READING ACHIEVEMENT OF MATCHED FEMALE PAIRS

	I.T.A. N=55		T.O. N=55		
Stanford Achievement, Primary, Form X	M.	S.D.	M.	S.D.	z test
Word Reading	27.27	5.60	25.44	6.34	1.544
Paragraph Meaning	26.02	8.47	26.64	8.56	-0.394
Word Study Skills	43.86	6.87	44.25	7.37	-0.329

TABLE XXI
INTERACTION OF SEX, BELOW AVERAGE SOCIO-ECONOMIC STATUS AND TREATMENTS ON READING ACHIEVEMENT OF MATCHED FEMALE PAIRS

	I.T.A. N=8		T.O. N=8		
Stanford Achievement, Primary, Form X	M.	S.D.	M.	S.D.	z test
Word Reading	23.88	5.32	19.88	6.57	1.582
Paragraph Meaning	22.50	8.62	20.00	9.00	0.791
Word Study Skills	35.75	6.02	37.35	11.53	-0.602

However, Tables XVIII through XXI, showing the effect of the treatments when sex and socio-economic status are both controlled, indicate no statistical advantage for either treatment. A measure of caution in generalizing from these interaction findings is warranted since several of the analyses are dependent on a small number of observations.

CHAPTER IV

CONCLUSIONS AND IMPLICATIONS

The major purpose of the study was to investigate the differences, if any, between two populations in reading achievement when the methodology used in teaching was controlled but the orthography which each population used in learning to read was different.

Within the limitations of the study as presented in Chapter One, the following conclusions concerning each problem presented seem to be valid.

PROBLEM I

1. There is a major difference between the instructional level achievements of the I.T.A. and T.O. populations in favor of the I.T.A. population at the tenth week point in instruction.

PROBLEM II

2. There is a major difference between the median instructional level achievement of the I.T.A. and T.O. subsample populations as measured by the Botel Reading Inventory in favor of the I.T.A. population when each population is tested in its medium of instruction.
3. There is a statistically significant difference in the achievement of the I.T.A. subsample population from the subsample of the T.O. population at the mid-point in instruction on the measure of word reading from the Stanford Achievement Test when each population is tested in its medium. Mean differences on the measures of paragraph meaning, vocabulary, and word

study skills favor the I.T.A. population but are not statistically significant.

PROBLEM III

4. There are no statistically significant differences between the I.T.A. and T.O. subsample populations on measures of oral reading accuracy and word recognition when the populations are tested on the T.O. standard.

PROBLEM IV

5. There is a statistically significant difference in the achievement of the I.T.A. matched pairs on the word reading subtest of a T.O. form of the Stanford Achievement Test.
6. There is a statistically significant difference in the achievement of the T.O. matched pairs on the spelling subtest of a T.O. form of the Stanford Achievement Test.

PROBLEM V

7. There is a statistically significant difference in the word meaning achievement of the matched pairs having above average socio-economic status in favor of the I.T.A. treatment.

GENERAL CONCLUSIONS

The conclusions for this study may be summarized as follows:

1. The use of an I.T.A. medium with an eclectic methodology that emphasizes the unity of the language arts permits early development of significant reading skill.
2. The use of an identical methodology with traditional orthography is unable to overcome the inhibiting effects

of the complexity of the phoneme-grapheme correspondences on early reading achievement.

3. The use of the I.T.A. medium with an eclectic methodology emphasizing the unity of the language arts permits the development of skill in word reading which is significantly different from that obtained using traditional orthography at the mid and end points of instruction but is no better than the same methods used with traditional orthography in developing the skills measured on the subtests of paragraph meaning, word study skills, or vocabulary.
4. The use of an I.T.A. medium is inferior to traditional orthography in developing spelling skills when traditional orthography is the criterion toward the end of the first grade year and when fifty per cent of the I.T.A. population are still being instructed in the I.T.A. medium.

IMPLICATIONS FOR EDUCATION

The above five general conclusions seem to justify the following implications for education. The use of an I.T.A. medium in a language arts oriented program of instruction has a significant value in overcoming the inhibiting effects of the complex phoneme-grapheme relationships of traditional English spelling on early reading achievement. Since the concern of education is in introducing the child as easily as possible to the reading act so as to avoid frustration and to encourage pleasure in reading, the I.T.A. medium may be used with confidence toward that end. Since

some advantage in favor of the I.T.A. medium at mid-year and year-end points is found on word reading subtests and no inferior results are noted on other measures of reading, teachers and administrators may feel confident that the I.T.A. medium used in a beginning program of instruction which emphasizes the language arts should result in a somewhat better overall reading performance as measured by standardized tests when that test is in T.O. The significant difference in spelling on the T.O. standard in favor of the T.O. population might be interpreted as a negative effect of I.T.A. instruction. Since, however, T.O. served as the criterion and almost half of the I.T.A. population had not made transition to the T.O. standard in instruction, a measure of caution in accepting this interpretation is justifiable. No interpretation of negative effects on spelling achievement, post-I.T.A. transition is warranted.

IMPLICATIONS FOR FURTHER RESEARCH

Further study of the effects of I.T.A. instruction when methodology is controlled appears to offer the greatest opportunity for achieving insight on the values of I.T.A. in reading achievement. Further study along the lines of the present study seem to be indicated. Among the problems that need investigation are the following:

1. The effect of I.T.A. versus T.O. instruction when methodology is controlled using identical materials. The production of the Early-to-Read materials in a T.O.

form could serve as an effective basis for such a comparison.

2. A study of the differences in achievement at the end of a year's instruction as measured by transliterated and T.O. forms when both populations are tested in the media used for instruction using standardized tests should provide additional information on the inhibiting effects of traditional orthography on reading achievement.
3. A study of the effects of I.T.A. versus T.O. instruction when methodology is controlled on reading and spelling achievement at the end of the second and third grade years should provide data from which to draw conclusions on long range effects of either medium.
4. An investigation of the influence of traditional orthography as compared with I.T.A. on a child's ability to perform on intelligence and aptitude tests using T.O. and transliterated forms should present information on the inhibiting effects of traditional spelling on such achievement.
5. The construction of reliable measures of reading ability which approximate the reading activity of the classroom and which are based on unaided recall questions should permit a more adequate assessment of children's ability to read under either medium.
6. An investigation of the main effects as well as the

interaction between such variables as I.T.A. and T.O. treatments, sex, socio-economic status, and I.Q. on reading achievement on larger populations which are established by random procedures might provide data which could be used to determine which type of population benefits most from which treatment.

BIBLIOGRAPHY

(1) Downing, J. A. Experiments With an Augmented Alphabet for Beginning Readers in British Schools. New York: Educational Records Bureau, 1962.

(2) Downing, J. A. and Halliwell, Stanley. "The I.T.A. Reading Experiment in Britain." Improvement of Reading Through Classroom Practice, IRA Proceedings, Vol. 9, 1964, Newark, pp. 260-265.

(3) Harrison, Maurice. Instant Reading, Sir Issac Pitman and Sons, Ltd.: London, 1964, p. 43.

(4) March, Frances A. The Spelling Reform, Bureau of Education Circular, Washington, 1893.

(5) Mazurkiewicz, Albert J. "The Initial Teaching Alphabet (Augmented Roman) for Teaching Reading" New Perspectives in Reading Instruction, New York: Pitman Publishing Corporation, 1964, pp. 541-542.

(6) Mazurkiewicz, Albert J. "Interim Report 9, the Lehigh - Bethlehem I.T.A. Study," Journal of the Reading Specialist, October, 1965, Vol. 5, No. 1.

(7) Mazurkiewicz, Albert J. "The Lehigh - Bethlehem I.T.A. Study," Improvement of Reading Through Classroom Practice, IRA Proceedings, Vol. 9, Newark, Delaware, 1965, pp. 265-268.

(8) Mazurkiewicz, Albert J. "The Initial Teaching Alphabet, A Description," I.T.A. and the World of English, the i/t/a Foundation, New York, 1965.

(9) Pitman, I. J. "Learning to Read: An Experiment," Journal of the Royal Society of Arts, Vol. 109, pp. 149-180, 196.

(10) Sebesta, Sam Leaton. Artificial Orthography as a Transitional Device in First-Grade Reading Instruction, Dissertation, Stanford University, June, 1963.

APPENDIX A

SUPPORTING DATA ON MAJOR PROBLEMS

Identifying Data and Raw Scores on the Sub-tests of
The Stanford Achievement Test, Primary I
Form X, of 118 Matched Pairs

Pair No.	I.Q.	C.A.	Sex*	SocioEc.** Status	Word Read.	Parag. Mean.	Voc.	Sp.	W. St. Skills
#1	91	79	2	1	28	15	17	10	40
##	91	75	2	1	13	16	17	12	35
2	94	71	2	1	9	10	14	5	29
	94	77	2	1	28	24	18	20	52
3	95	73	2	1	18	11	12	4	32
	95	74	2	1	15	16	17	7	33
4	100	69	2	1	30	17	15	8	40
	100	74	2	1	25	29	24	16	35
5	100	78	2	1	32	29	24	8	51
	100	79	2	1	22	18	14	13	40
7	103	78	2	1	25	27	19	7	45
	103	79	2	1	20	14	20	13	35
8	103	78	2	1	28	28	21	8	41
	103	78	2	1	18	8	14	2	21
9	104	78	2	1	27	28	16	9	31
	104	71	2	1	25	17	18	19	43
10	106	73	2	1	18	11	19	6	29
	106	70	2	1	22	18	22	15	40
11	107	72	2	1	24	29	20	11	37
	107	78	2	1	31	31	30	20	47
13	108	77	2	1	27	24	25	7	42
	108	77	2	1	24	21	29	19	40
16	109	74	2	1	29	30	29	15	49
	109	74	2	1	21	27	20	17	45
17	109	78	2	1	32	33	27	20	48
	109	77	2	1	31	32	24	17	47
19	112	76	2	1	32	35	20	20	50
	112	78	2	1	12	13	23	16	37
20	113	77	2	1	28	28	20	9	47
	113	78	2	1	29	36	29	18	52
21	114	68	2	1	24	19	13	11	39
	114	70	2	1	16	20	15	8	36
24	114	70	2	1	23	24	21	9	41
	114	75	2	1	31	29	25	20	53
25	115	76	2	1	34	34	33	19	52
	115	79	2	1	26	30	30	15	47
27	116	74	2	1	29	33	20	7	46
	116	70	2	1	21	32	28	16	43
28	116	78	2	1	31	0	22	10	50
	116	68	2	1	31	32	18	19	50
30	117	74	2	1	17	19	22	9	38
	117	70	2	1	32	37	22	19	47

*(1) Boy (2) Girl
**(1) Good (2) Poor
#Upper Row contains data for i/t/a child
##Lower Row contains data for T.O. partner

Pair No.	I.Q.	C.A.	Sex*	SocioEc.** Status	Word Read.	Parag. Mean.	Voc.	Sp.	W. St. Skills
31	117	70	2	1	31	32	24	6	43
	117	69	2	1	13	5	12	1	20
32	117	68	2	1	22	24	29	8	42
	117	74	2	1	34	38	29	20	52
33	117	70	2	1	27	14	23	8	40
	117	73	2	1	24	27	22	16	43
34	118	72	2	1	27	35	21	17	51
	118	76	2	1	29	34	26	20	45
36	119	72	2	1	33	35	22	13	48
	119	71	2	1	25	29	30	16	45
37	119	71	2	1	22	25	21	8	41
	119	71	2	1	31	33	27	20	52
38	119	68	2	1	30	33	24	13	47
	119	79	2	1	29	33	23	17	50
39	119	77	2	1	23	26	26	7	40
	119	77	2	1	32	37	27	20	53
40	120	77	2	1	29	36	33	15	43
	120	75	2	1	23	20	23	16	40
41	120	77	2	1	23	21	27	7	43
	120	73	2	1	20	23	28	11	41
42	120	80	2	1	27	22	29	9	32
	120	78	2	1	18	21	31	16	37
43	120	71	2	1	22	11	25	8	36
	120	74	2	1	29	36	29	20	48
45	120	74	2	1	33	34	29	11	53
	120	75	2	1	20	11	21	15	49
46	121	79	2	1	32	32	29	15	47
	121	72	2	1	22	27	22	18	42
47	121	68	2	1	17	15	14	10	31
	121	71	2	1	26	27	18	18	44
48	121	69	2	1	22	26	24	10	46
	121	75	2	1	21	21	28	16	46
49	121	71	2	1	34	31	29	17	52
	121	70	2	1	16	12	16	0	24
50	122	72	2	1	33	35	29	18	51
	122	78	2	1	32	37	36	20	48
51	122	75	2	1	20	21	23	8	37
	122	79	2	1	22	22	28	10	39
52	123	77	2	1	31	30	25	13	48
	123	70	2	1	31	34	22	17	51
53	124	70	2	1	28	19	25	14	44
	124	79	2	1	33	32	32	18	48
55	127	74	2	1	35	37	23	16	52
	127	76	2	1	30	30	23	19	49
56	127	71	2	1	31	27	28	9	51
	127	76	2	1	15	17	23	12	42
57	127	71	2	1	30	21	27	11	31
	127	75	2	1	18	21	23	9	37
58	128	73	2	1	30	31	25	8	43
	128	70	2	1	31	32	28	20	49
59	129	76	2	1	33	35	26	9	53
	129	72	2	1	26	36	30	16	50

Pair No.	I.Q.	C.A.	Sex*	SocioEc.** Status	Word Read.	Parag. Mean.	Voc.	Sp.	W. St. Skills
60	129	76	2	1	30	35	20	10	45
	129	76	2	1	35	37	37	20	53
61	130	79	2	1	15	21	29	7	44
	130	76	2	1	34	37	36	20	49
62	130	71	2	1	34	37	34	20	51
	130	78	2	1	30	37	32	19	50
63	131	70	2	1	29	29	21	19	52
	131	71	2	1	33	35	29	19	50
64	132	74	2	1	33	31	27	8	43
	132	77	2	1	33	34	31	20	54
66	134	73	2	1	34	33	28	15	53
	134	76	2	1	30	29	29	20	49
67	134	69	2	1	25	16	28	9	50
	134	70	2	1	27	29	19	18	48
68	136	71	2	1	30	37	21	13	52
	136	79	2	1	34	32	31	20	51
69	91	76	1	1	7	3	15	4	17
	91	73	1	1	23	19	28	15	38
71	98	69	1	1	7	3	15	4	17
	98	74	1	1	19	7	23	12	30
74	102	73	1	1	21	30	21	8	46
	102	74	1	1	25	15	22	11	40
76	102	69	1	1	19	12	20	7	33
	102	76	1	1	10	9	22	5	25
78	102	72	1	1	19	10	18	7	36
	102	76	1	1	18	17	21	5	36
80	105	69	1	1	29	25	22	15	42
	105	79	1	1	22	15	38	16	44
81	105	76	1	1	30	24	25	8	43
	105	69	1	1	21	15	14	18	31
84	107	69	1	1	27	28	24	12	46
	107	76	1	1	8	10	26	4	31
85	107	68	1	1	18	13	12	8	41
	107	79	1	1	22	8	20	16	42
86	108	76	1	1	35	38	28	17	53
	108	73	1	1	28	21	18	15	37
87	108	77	1	1	24	26	27	9	39
	108	71	1	1	21	24	21	15	38
88	108	70	1	1	13	2	15	8	31
	108	78	1	1	23	19	21	13	40
91	112	78	1	1	17	8	23	7	28
	112	71	1	1	27	33	29	18	48
92	112	78	1	1	26	32	24	14	46
	112	74	1	1	17	15	27	7	41
94	113	71	1	1	14	6	19	8	41
	113	80	1	1	19	18	27	12	42
95	113	78	1	1	28	31	29	19	46
	113	77	1	1	15	12	20	14	32
97	114	70	1	1	13	10	21	6	29
	114	70	1	1	29	34	23	20	50
98	114	77	1	1	27	30	23	7	40
	114	73	1	1	25	21	30	17	46

Pair No.	I.Q.	C.A.	Sex*	SocioEc.** Status	Word Read.	Parag. Mean.	Voc.	Sp.	W. St. Skills
99	114	71	1	1	31	27	15	8	41
	114	76	1	1	26	24	23	16	45
102	115	78	1	1	32	34	31	19	51
	115	80	1	1	19	17	30	16	46
103	116	75	1	1	19	25	33	9	37
	116	72	1	1	12	13	17	1	20
104	116	70	1	1	19	15	16	6	35
	116	68	1	1	23	19	16	20	47
105	116	75	1	1	16	14	22	5	33
	116	79	1	1	20	14	21	5	33
106	116	77	1	1	18	24	23	7	25
	116	75	1	1	19	18	26	12	42
107	117	70	1	1	21	18	20	8	41
	117	75	1	1	25	14	30	7	48
108	117	76	1	1	34	36	31	17	53
	117	78	1	1	32	35	29	20	52
110	117	76	1	1	32	34	29	18	46
	117	76	1	1	19	22	25	11	41
111	117	76	1	1	29	29	28	16	43
	117	69	1	1	21	19	24	20	43
112	118	75	1	1	15	3	19	6	28
	118	77	1	1	23	29	29	17	48
113	118	73	1	1	32	34	27	18	44
	118	75	1	1	30	32	31	18	45
114	118	73	1	1	24	19	25	6	43
	118	77	1	1	23	27	30	17	49
116	118	74	1	1	19	28	33	10	42
	118	77	1	1	29	32	30	19	48
118	119	78	1	1	28	24	28	14	45
	119	69	1	1	24	29	31	18	45
119	121	76	1	1	29	33	28	10	40
	121	79	1	1	23	17	28	16	40
121	122	75	1	1	27	18	23	7	49
	122	79	1	1	23	17	21	15	45
122	122	79	1	1	31	24	26	10	41
	122	75	1	1	27	33	26	18	48
123	122	78	1	1	32	32	28	13	50
	122	75	1	1	25	23	24	17	39
124	123	78	1	1	32	34	24	10	49
	123	75	1	1	32	34	29	18	50
125	123	71	1	1	31	29	30	12	49
	123	73	1	1	22	12	22	6	43
126	123	72	1	1	17	8	11	3	24
	123	78	1	1	28	36	38	20	41
127	122	78	1	1	25	28	24	7	41
	122	71	1	1	29	34	34	20	48
131	125	74	1	1	28	10	30	9	38
	125	78	1	1	22	24	27	16	44
134	120	74	1	1	17	17	24	6	42
	120	78	1	1	25	26	34	20	48
135	130	73	1	1	29	32	22	10	45
	130	71	1	1	26	33	25	14	47

Pair No.	I.Q.	C.A.	Sex*	SocioEc.** Status	Word Read.	Parag. Mean.	Voc.	Sp.	W. St. Skills
136	131	73	1	1	24	34	20	11	47
	131	73	1	1	15	19	22	12	35
137	135	71	1	1	24	19	27	10	32
	135	76	1	1	21	18	19	11	32
139	143	71	1	1	33	34	28	18	46
	143	69	1	1	21	25	31	15	45
140	91	77	2	2	20	4	18	5	26
	91	77	2	2	8	9	17	2	18
141	107	76	2	2	28	27	14	8	38
	107	76	2	2	15	16	19	16	35
143	109	78	2	2	17	18	24	9	33
	109	74	2	2	24	26	19	13	40
145	114	69	2	2	15	18	13	9	30
	114	72	2	2	15	11	14	6	25
146	118	68	2	2	26	24	14	6	37
	118	77	2	2	29	33	23	20	48
147	119	76	2	2	27	25	20	7	34
	119	73	2	2	18	10	21	4	31
148	124	74	2	2	28	31	27	15	42
	124	72	2	2	25	25	19	19	47
149	136	79	2	2	30	33	27	12	46
	136	73	2	2	25	30	33	19	54
151	96	77	1	2	28	33	19	8	37
	96	69	1	2	7	8	16	2	25
153	102	78	1	2	16	12	27	6	34
	102	78	1	2	20	13	23	15	43
155	106	77	1	2	15	3	19	6	26
	106	70	1	2	6	7	10	6	26
158	109	71	1	2	15	10	19	6	29
	109	69	1	2	31	23	19	20	53
159	109	70	1	2	31	34	25	18	43
	109	75	1	2	29	27	15	18	44
160	112	70	1	2	14	11	18	7	25
	112	68	1	2	23	20	27	36	0
161	112	69	1	2	20	23	25	7	36
	112	69	1	2	27	25	19	17	44
163	117	76	1	2	18	15	8	6	34
	117	72	1	2	12	9	13	2	27

APPENDIX B

SELECTED TESTS USED IN THIS STUDY

PHONETICALLY REGULAR WORDS ORAL READING TEST

Child's Name_____Date_____

School_____Room_____Code Number_____

Examiner_____Number of words read correctly_____

1. nap	16. walk
2. pen	17. haul
3. hid	18. jaw
4. job	19. soil
5. rug	20. joy
6. shade	21. frown
7. drive	22. trout
8. joke	23. term
9. mule	24. curl
10. plain	25. birch
11. hay	26. rare
12. keen	27. star
13. least	28. porch
14. loan	29. smooth
15. show	30. shook

Directions: Have pupil read words from one copy while examiner makes another copy. Do not give pupil a second chance but accept immediate self-correction. Let every student try the whole first column. If he gets two words correct from word number six on, let him try the whole second column.

GATES WORD PRONUNCIATION TEST

EXAMINER'S COPY

DIRECTIONS: Have the child read the words out loud. Tell him you would like him to read some words for you. If he fails the first time, ask him to try the word again Continue until ten consecutive words have been missed. As the words become difficult, special care should be taken to encourage the child. The score is one point for each word correctly pronounced on the first trial, one-half point for each word correctly pronounced on the second trial. (Note: 9½ correct would be scored as 10.)

---

1. so
2. we
3. as
4. go
5. the
6. not
7. how
8. may
9. king
10. here
11. grow
12. late
13. every
14. about
15. paper
16. blind
17. window
18. family
19. perhaps
20. plaster
21. passenger
22. wander
23. interest
24. chocolate
25. dispute
26. portion
27. conductor
28. brightness
29. intelligent
30. construct
31. position
32. profitable
33. irregular
34. schoolmaster
35. lamentation
36. community
37. satisfactory
38. illustrious
39. superstition
40. affectionate

Child's name: _____ Test date ____ ____ ____

Examiner: _____ Birth date ____ ____ ____

Age: _____

KARLSEN PHONEMIC WORD TEST

EXAMINER'S COPY

DIRECTIONS: 1. Hand the PUPIL'S COPY to the pupil.
2. Say: "Read these words out loud."
3. Note the pupil's errors on *this* sheet.
4. Do not give the pupil a second chance, but accept immediate self-correction.
5. Continue until the child misses 5 consecutive words.
6. The score is the number of words pronounced correctly.

---

1. fit
2. tap
3. rod
4. get
5. would
6. mother
7. down
8. age
9. think
10. long
11. kind
12. yard
13. foot
14. gold
15. freeze
16. chair
17. mouth
18. carry
19. hope
20. beat
21. loaf
22. cowboy
23. furniture
24. page
25. push
26. huge
27. snowball
28. thirteen
29. scare
30. sunshine
31. gymnasium
32. join
33. usual
34. zone
35. teaspoon
36. monument
37. senior
38. flute
39. behave
40. faucet

Child's name: _____ Test date ___ ___ ___

Examiner: _____ Birth date ___ ___ ___

Age: _____